SEQUENCE LISTING

<110> Galilaeus Oy

<120> The gene cluster involved in aclacinomycin
      biosynthesis, and its use for genetic engineering

<130> 33318

<140>
<141>

<160> 16

<170> PatentIn Ver. 2.2

<210> 1
<211> 662
<212> PRT
<213> *Streptomyces galilaeus*

<400> 1
Met Thr Glu Asp Arg Val Thr Thr Leu Gly Gly Glu Gln Ile Ala Leu
 1   5   10   15

Leu Ala Pro Leu Leu Asp Gly Ser Arg Asp Leu Pro Gly Ile Val Ala
            20   25   30

Asp Ala Ala Pro Arg Leu Pro Ala Gly Leu Ala Glu Arg Leu Val Thr
            35   40   45

Arg Leu Leu Asp Ala Gly Leu Leu Cys Ala Tyr Pro Gln Asp Gly Ala
     50   55   60

Asp Arg Pro Glu Arg Ala Tyr Arg Ser Leu Thr Gly Leu Gln Ala Arg
 65   70   75   80

Ser Ala Asp Ala Arg Asp Ala Val Leu Ala Ala Val Asp Leu Thr Gly
                85   90   95

Asp Ala Glu Ser Pro Leu Pro Glu Ala Val Ser Ala Ala Gly Leu Arg
               100   105   110

Ala Ala Ala Pro Gly Glu His Ala Ala Leu Thr Leu Val Leu Cys His
           115   120   125

Asp Tyr Leu Asp Pro Arg Leu Ser Ala Leu Asp Ala Glu His Arg Ala
       130   135   140

Thr Gly Arg Gly Trp Leu Pro Val Arg Ala Asn Gly Thr His Leu Trp
145   150   155   160

Ile Gly Pro Phe Phe Ser Ala Gly Asp Gly Pro Cys Trp Ser Cys Leu
               165   170   175

Ala Asp Arg Leu Arg Leu Arg Arg Arg Gly Glu Ala Tyr Val Gln His
           180   185   190

Arg Leu Gly His Ser Gly Pro Ala Val His Arg Arg Ala Tyr Leu Pro
     195   200   205

Ala Gly Arg Ala Ala Ala Leu Gln Leu Ala Leu Leu Glu Ala Gly Lys
     210   215   220

Trp Leu Ser Gly His Arg Asp Thr Val Gln Asp Ser Leu Trp Arg Leu
225   230   235   240

Asp Thr Arg Thr Leu Glu Ser Ser Arg His Pro Val Arg Arg Arg Pro
          245   250   255

Gln Cys Ser Arg Cys Gly Asp Pro Leu Leu Val Arg Asp Arg Val Ser
     260   265   270

Ala Pro Val Val Leu Ser Ser Arg Pro Val Arg Asp Glu Ser Gly Gly
     275   280   285

Gly His Arg Thr Phe Gly Pro Gln Glu Met Leu Asp Arg Tyr Gly His
     290   295   300

Leu Val Asp Pro Val Thr Gly Val Val Gly Glu Ile Arg Arg Asp Pro
305   310   315   320

Arg Gly Pro Glu Phe Leu Asn Cys Phe Thr Arg Ser Arg Cys Arg Leu
          325   330   335

Gly Pro Arg Ala Ala Pro Pro Ala Leu His Ser Pro Leu Arg Ser Pro
     340   345   350

Gly Ser Gly Lys Gly Val Thr Glu Leu His Ala Arg Val Ser Ala Leu
     355   360   365

Ala Glu Ala Leu Glu Arg Cys Ser Gly Tyr Phe Gln Gly Asp Glu Pro
     370   375   380

Arg Arg Arg Gly Ser Tyr Arg Glu Leu Ala Gly Leu Ala Val His Pro
385   390   395   400

Asp Ser Val Gln Leu Phe Asp Arg Arg Gln Phe Glu Asp Arg Arg Ala
          405   410   415

Trp Asn Arg Ala His Gly Pro Phe His Gln Val Thr Glu Pro Phe Asp
     420   425   430

Glu Asp Ala Pro Ile Asp Trp Thr Pro Val Trp Ser Leu Thr Glu Arg
     435   440   445

Arg Gln Arg Leu Ala Pro Thr Ser Leu Leu Tyr Tyr Asn Ala Pro Asp
     450   455   460

Ala Asp Thr Gly Phe Cys Arg Ala Thr Ser Asn Gly Ala Ala Ala Gly
465   470   475   480

Thr Ser Leu Glu Asp Ala Val Val His Gly Cys Leu Glu Leu Val Glu
          485   490   495

```
Arg Asp Ala Ile Ala Leu Trp Trp Tyr Asn Arg Thr Arg Gln Pro Gly
        500                 505                 510

Val Thr Leu Asp Ala Arg Asp Pro Trp Ile Thr Arg Leu Arg Ala Val
        515                 520                 525

Leu Arg Asp Leu Gly Arg Thr Val Trp Ala Leu Asp Leu Thr Ser Asp
    530                 535                 540

Leu Gly Ile Pro Val Val Ala Ala Val Ser Val Arg Thr Gly Gly Thr
545                 550                 555                 560

Ala Glu Asp Ile Val Leu Gly Phe Gly Ala His Phe Asp Pro Arg Ile
            565                 570                 575

Ala Leu Arg Arg Ala Leu Thr Glu Leu Ser Gln Met Leu Pro Pro Leu
        580                 585                 590

Ala Gln Glu Thr Ala Gly Asp Ala Ser Ala Tyr Thr Gly Thr Asp Pro
        595                 600                 605

Glu Ala Met Arg Trp Phe Arg His Ala Thr Thr Ala Asn Gln Pro Tyr
    610                 615                 620

Leu Leu Pro Ala Ala Arg Arg Ser Ala Arg Pro Pro Ala Ser Leu Arg
625                 630                 635                 640

Pro Pro Arg Asp Ala Ala Ala Gln Ala Gly Ala Leu Val Ala Leu Leu
            645                 650                 655

Arg Arg His Gly Leu Glu
            660


<210> 2
<211> 272
<212> PRT
<213> Streptomyces galilaeus

<400> 2
Val Asp Ile Trp Leu Leu Gly Pro Leu Thr Ala Glu Val Arg Gly Arg
  1               5                   10                  15

Ser Ile Val Pro Thr Ala Ala Lys Pro Arg Gln Ile Leu Ala Leu Leu
            20                  25                  30

Ala Ile His Ala Asn Arg Val Leu Pro Val Gly Thr Leu Met Glu Glu
        35                  40                  45

Ile Trp Gly Thr Glu Pro Pro Gln Ser Ala Leu Ala Thr Leu His Thr
    50                  55                  60

Tyr Ile Leu Gln Leu Arg Arg Arg Leu Thr Ala Ala Tyr Gly Asp Glu
65                  70                  75                  80

Gly Gly Val Ser Ala Lys Asp Val Leu Val Thr Gln Tyr Gly Gly Tyr
            85                  90                  95
```

```
Cys Trp Gln Ala Pro Thr Asp Ser Val Asp Val Pro Arg Tyr Glu Arg
            100               105               110

Leu Val Thr Ala Gly Arg Ile Ala Thr Ala Glu Asp Arg Gln Glu Glu
            115               120               125

Ala Ser Ala His Phe Arg Glu Ala Leu Ala Leu Trp Arg Gly Ser Ala
            130               135               140

Leu Val Asp Val Arg Ile Gly Pro Val Leu Ser Ile Glu Val Ala Arg
145               150               155               160

Leu Glu Glu Ser Arg Leu Gly Val Leu Glu Arg Cys Leu Glu Ala Asp
                165               170               175

Leu Arg Leu Gly Arg His Ala Glu Leu Leu Ala Glu Leu Thr Glu Leu
                180               185               190

Thr Gly Arg His Pro Leu His Glu Gly Leu His Ala Gln Cys Met Thr
                195               200               205

Ala Leu Tyr Arg Ala Gly Arg Ser Trp Gln Ala Leu Asp Val Tyr Gln
            210               215               220

Arg Leu Arg Arg Arg Leu Ala Glu Glu Leu Gly Leu Ser Pro Ser Pro
225               230               235               240

Arg Leu Gln Arg Leu Gln Gln Ala Val Leu Ser Ala Glu Pro Trp Leu
                245               250               255

Asp Ala Pro Arg Tyr Gly Gly Asp Pro Val Phe Asp Arg Met Ile Ser
                260               265               270
```

```
<210> 3
<211> 434
<212> PRT
<213> Streptomyces galilaeus

<400> 3
Met Thr Ser Asp Thr Lys Ala Leu Val Leu Glu Gln Val Arg Glu Tyr
  1               5               10               15

His Arg Gln Gln Gln Pro Gly Asn Phe Gln Pro Gly Val Thr Pro Ile
            20               25               30

Leu Ser Ser Gly Ala Val Leu Asp Glu Glu Asp Arg Val Ala Leu Val
            35               40               45

Glu Ala Ala Leu Asp Leu Arg Ile Ala Ala Gly Ala His Ser Arg Arg
    50               55               60

Phe Glu Ser Lys Phe Ala Arg His Ile Gly Val Arg Lys Ala His Leu
65               70               75               80

Val Asn Ser Gly Ser Ser Ala Asn Leu Leu Ala Leu Ser Ala Leu Thr
                85               90               95
```

Ser Pro Arg Leu Gly Glu Gln Arg Leu Arg Pro Gly Asp Glu Val Ile
          100   105   110

Thr Val Ala Gly Gly Phe Pro Thr Thr Val Asn Pro Ile Leu Gln Asn
          115   120   125

Gly Leu Thr Pro Val Phe Val Asp Leu Glu Leu Gly Thr Tyr Asn Thr
          130   135   140

Thr Val Glu His Val Arg Ala Ala Ile Ser Asp Arg Thr Arg Ala Ile
145   150   155   160

Met Ile Ala His Thr Leu Gly Asn Pro Tyr Gln Val Ala Glu Ile Gln
          165   170   175

Gln Leu Ala Thr Glu His Glu Leu Phe Leu Ile Glu Asp Asn Cys Asp
          180   185   190

Ala Val Gly Ser Thr Tyr Gln Gly Arg Met Thr Gly Thr Phe Gly Asp
          195   200   205

Leu Ala Thr Val Ser Phe Tyr Pro Ala His His Ile Thr Thr Gly Glu
          210   215   220

Gly Gly Cys Val Leu Thr Arg Asn Leu Glu Leu Ala Arg Ile Val Glu
225   230   235   240

Ser Phe Arg Asp Trp Gly Arg Asp Cys Trp Cys Glu Pro Gly Glu Asp
          245   250   255

Asn Thr Cys Leu Lys Arg Phe Asp Tyr Gln Leu Gly Asn Leu Pro Lys
          260   265   270

Gly Tyr Asp His Lys Tyr Ile Phe Ser His Ile Gly Tyr Asn Leu Lys
          275   280   285

Ala Thr Asp Leu Gln Gly Ala Leu Ala Leu Ser Gln Leu Asn Lys Leu
          290   295   300

Pro Glu Phe Gly Ala Ala Arg Arg Arg Asn Trp Gln Arg Leu Arg Asp
305   310   315   320

Gly Leu Ala Asp Val Pro Gly Leu Leu Leu Pro Val Ala Thr Pro Gly
          325   330   335

Ser Asp Pro Ser Trp Phe Gly Phe Val Ile Thr Val Leu Pro Asp Ala
          340   345   350

Thr Tyr Thr Arg Arg Asp Leu Val Ala Phe Leu Glu Glu Arg Arg Ile
          355   360   365

Gly Thr Arg Arg Leu Phe Gly Gly Asn Leu Thr Arg His Pro Ala Tyr
          370   375   380

Leu Gly Thr Pro His Arg Val Ala Gly Asp Leu Arg Asn Ser Asp Ile
385   390   395   400

Ile Thr Glu Gln Ser Phe Trp Ile Gly Val Tyr Pro Gly Ile Thr Glu
                405   410   415

Glu Met Thr Asp Tyr Met Arg Glu Ser Ile Val Glu Phe Val Thr Lys
                420   425   430

Asn Gly

<210> 4
<211> 329
<212> PRT
<213> *Streptomyces galilaeus*

<400> 4
Met Pro Lys Asp Thr Pro Arg Pro Val Leu Arg Ile Gly Val Leu Gly
 1   5   10   15

Cys Ala Asp Ile Ala Val Arg Arg Ile Leu Pro Ala Ile Val Glu His
                20   25   30

Pro Ser Val Arg Leu Val Ala Leu Ala Ser Arg Asp Gly Ala Arg Ala
            35   40   45

Glu Arg Leu Ala Ala Arg Phe Gly Cys Ala Ala Val Thr Gly Tyr Lys
        50   55   60

Ala Leu Leu Asp Arg Glu Asp Ile Asn Ala Val Tyr Val Pro Leu Pro
65   70   75   80

Pro Gly Met His His Glu Trp Val Thr Glu Ala Leu Thr Ala Gly Lys
                85   90   95

His Val Leu Val Glu Lys Pro Leu Ser Thr Thr Tyr Ala Gln Ser Val
                100   105   110

Asp Leu Val Ala Met Ala Gly Arg Leu Gly Leu Ala Leu Thr Glu Asn
            115   120   125

Phe Met Phe Leu His His Ser Gln His Glu Ala Val Arg Ala Met Thr
        130   135   140

Gly Glu Ile Gly Glu Leu Arg Val Phe Thr Ser Ser Phe Gly Val Pro
145   150   155   160

Pro Pro His Pro Ser Ser Phe Arg His Asp Ala Arg Leu Gly Gly Gly
                165   170   175

Ala Leu Leu Asp Val Gly Val Tyr Pro Leu Arg Ala Ala Gln Leu His
            180   185   190

Leu Ala Gly Glu Leu Asp Val Leu Gly Ala Cys Leu Arg Val Asp Glu
        195   200   205

Ala Thr Gly Val Asp Val Ala Gly Ser Ala Leu Leu Ser Thr Ala Thr
        210   215   220

```
Gly Val Thr Ala Gln Leu Asp Phe Gly Phe Gln His Ala Tyr Arg Ser
225                 230             235             240

Val Tyr Ala Leu Trp Gly Ser Arg Gly Arg Leu Ser Val Pro Arg Ala
                245             250             255

Phe Thr Pro Pro Arg Glu His Arg Pro Val Val Arg Ile Glu Gln Gln
            260             265             270

Asp Arg Leu Thr Glu Val Thr Leu Pro Ala Asp His Gln Val Gly Asn
        275             280             285            .

Ala Leu Asp Ala Phe Ala Ser Ala Val His Ser Glu Thr Val Arg Ala
        290             295             300

Ser Leu Gly Glu Ala Leu Leu Arg Gln Ala Leu Leu Val Glu Gln Val
305             310             315             320

Arg Lys Ala Ala Arg Val Val Ser Gly
                325
```

```
<210> 5
<211> 323
<212> PRT
<213> Streptomyces galilaeus

<400> 5
Met Arg Val Leu Ile Thr Gly Gly Ala Gly Phe Ile Gly Ser His Tyr
1               5               10              15

Val Arg Ser Leu Leu Ala Gly Thr Leu Pro Gly Pro Arg Pro Ser Arg
                20              25              30

Val Thr Val Val Asp Leu Leu Thr Tyr Ala Gly Asp Thr Gly Asn Leu
        35              40              45

Pro Leu Ala Asp Pro Arg Leu Asp Phe Arg Arg Leu Asp Ile Arg Asp
    50              55              60

Leu Asp Ala Leu Leu Thr Val Val Pro Gly His Asp Ala Val Val His
65              70              75              80

Phe Ala Ala Glu Thr His Val Asp Arg Ser Leu Ser Glu Pro Ala Glu
                85              90              95

Phe Val Arg Thr Asn Val Leu Gly Thr Gln Ser Leu Leu Glu Ala Ser
            100             105             110

Leu Arg Gly Gly Val Gly Thr Phe Val His Val Ser Thr Asp Glu Val
        115             120             125

Tyr Gly Ser Ile Ala Gln Gly Thr Trp Thr Glu Glu Ala Pro Leu Leu
    130             135             140

Pro Asn Ser Pro Tyr Ala Ala Ser Lys Ala Gly Ser Asp Leu Val Ala
145             150             155             160
```

```
Arg Ser Tyr Trp Arg Thr His Gly Leu Asp Val Arg Thr Thr Arg Cys
            165             170             175

Ala Asn Asn Tyr Gly Pro Arg Gln His Pro Glu Lys Leu Ile Pro Leu
            180             185             190

Phe Val Thr Glu Leu Leu Ala Gly Arg Pro Val Pro Leu Tyr Gly Asp
            195             200             205

Gly Gly Asn Val Arg Glu Trp Leu His Val Asp Asp His Cys Arg Ala
    210             215             220

Val His Ala Val Leu Thr Gly Gly Arg Pro Gly Glu Ile Tyr Asn Ile
225             230             235             240

Gly Gly Gly Thr His Leu Thr Asn Arg Glu Met Thr Ala Lys Leu Leu
            245             250             255

Ala Leu Cys Gly Thr Asp Trp Ser Arg Val Arg Gln Val Pro Asp Arg
            260             265             270

Lys Gly His Asp Leu Arg Tyr Ala Val Asp Asp Thr Lys Ile Arg Glu
            275             280             285

Glu Leu Gly Tyr Arg Pro Leu Arg Ser Leu Asp Asp Gly Leu Arg Glu
    290             295             300

Val Val Asp Trp Tyr Arg Asp Arg Gln Thr His Arg Pro Glu Pro Ala
305             310             315             320

Glu Arg Val
```

```
<210> 6
<211> 443
<212> PRT
<213> Streptomyces galilaeus

<400> 6
Met Arg Val Leu Leu Thr Ser Phe Ala Leu Asp Ala His Phe Asn Gly
  1             5             10              15

Ser Val Pro Leu Ala Trp Ala Leu Arg Ala Ala Gly His Glu Val Arg
            20              25              30

Val Ala Ser Gln Pro Ala Leu Thr Ala Ser Ile Thr Ala Ala Gly Leu
            35              40              45

Thr Ala Val Pro Val Gly Ala Asp Pro Arg Leu Asp Glu Met Val Lys
    50              55              60

Gly Val Gly Asp Ala Val Leu Ser His His Ala Asp Gln Ser Leu Asp
 65              70              75              80

Ala Asp Thr Pro Gly Gln Leu Thr Pro Ala Phe Leu Gln Gly Trp Asp
                85              90              95
```

Thr Met Met Thr Ala Thr Phe Tyr Thr Leu Ile Asn Asp Asp Pro Met
        100   105   110

Val Asp Asp Leu Val Ala Phe Ala Arg Gly Trp Glu Pro Asp Leu Ile
        115   120   125

Leu Trp Glu Pro Phe Thr Phe Ala Gly Ala Val Ala Ala Lys Val Thr
        130   135   140

Gly Ala Ala His Ala Arg Leu Leu Ser Phe Pro Asp Leu Phe Met Ser
145   150   155   160

Met Arg Arg Ala Tyr Leu Ala Gln Leu Gly Ala Ala Pro Ala Gly Pro
        165   170   175

Ala Gly Gly Asn Gly Thr Thr His Pro Asp Asp Ser Leu Gly Gln Trp
        180   185   190

Leu Glu Trp Thr Leu Gly Arg Tyr Gly Val Pro Phe Asp Glu Glu Ala
        195   200   205

Val Thr Gly Gln Trp Ser Val Asp Gln Val Pro Arg Ser Phe Arg Pro
        210   215   220

Pro Ser Asp Arg Pro Val Val Gly Met Arg Tyr Val Pro Tyr Asn Gly
225   230   235   240

Pro Gly Pro Ala Val Val Pro Asp Trp Leu Arg Val Pro Pro Thr Arg
        245   250   255

Pro Arg Val Cys Val Thr Leu Gly Met Thr Ala Arg Thr Ser Glu Phe
        260   265   270

Pro Asn Ala Val Pro Val Asp Leu Val Leu Lys Ala Val Glu Gly Leu
        275   280   285

Asp Ile Glu Val Val Ala Thr Leu Asp Ala Glu Glu Arg Ala Leu Leu
        290   295   300

Thr His Val Pro Asp Asn Val Arg Leu Val Asp His Val Pro Leu His
305   310   315   320

Ala Leu Leu Pro Thr Cys Ala Ala Ile Val His His Gly Gly Ala Gly
        325   330   335

Thr Trp Ser Thr Ala Leu Val Glu Gly Val Pro Gln Ile Ala Met Gly
        340   345   350

Trp Ile Trp Asp Ala Ile Asp Arg Ala Gln Arg Gln Gln Ala Leu Gly
        355   360   365

Ala Gly Leu His Leu Pro Ser His Glu Val Thr Val Glu Gly Leu Arg
        370   375   380

Gly Arg Leu Val Arg Leu Leu Asp Glu Pro Ser Phe Thr Ala Ala Ala
385   390   395   400

Ala Arg Leu Arg Ala Glu Ala Glu Ser Glu Pro Thr Pro Ala Gln Val
            405   410   415

Val Pro Val Leu Glu Arg Leu Thr Ala Gln His Arg Ala Arg Glu Pro
            420   425   430

Arg Arg Pro Gly Gly Thr Ser Pro Cys Val Ser
            435   440

<210> 7
<211> 443
<212> PRT
<213> *Streptomyces galilaeus*

<400> 7
Val Gln Thr Gln Asn Ala Pro Glu Thr Ala Glu Asn Gln Gln Thr Asp
  1   5   10   15

Ser Glu Leu Gly Arg His Leu Leu Thr Ala Arg Gly Phe His Trp Ile
            20   25   30

Tyr Gly Thr Ser Gly Asp Pro Tyr Ala Leu Thr Leu Arg Ala Glu Ser
        35   40   45

Asp Asp Pro Ala Leu Leu Thr Arg Arg Ile Arg Glu Ala Gly Thr Pro
    50   55   60

Leu Trp Gln Ser Thr Thr Gly Ala Trp Val Thr Gly Arg His Gly Val
65   70   75   80

Ala Ala Glu Ala Leu Ala Asp Pro Arg Leu Ala Leu Arg His Ala Asp
                85   90   95

Leu Pro Gly Pro Gln Arg His Val Phe Ser Asp Ala Trp Ser Asn Pro
            100   105   110

Gln Leu Cys His Ile Ile Pro Leu Asp Arg Ala Phe Leu His Ala Ser
        115   120   125

Asp Ala Asp His Thr Arg Trp Ala Arg Ser Ala Ser Ala Val Leu Gly
    130   135   140

Ser Ala Gly Gly Ala Pro Ala Glu Gly Val Arg Glu His Ala Gly Arg
145   150   155   160

Val His Arg Glu Ala Ala Asp Arg Thr Gly Asp Ser Phe Asp Leu Met
                165   170   175

Ala Asp Tyr Ser Arg Pro Val Ala Thr Glu Ala Ala Ala Glu Leu Leu
            180   185   190

Gly Val Pro Ala Ala Gln Arg Glu Arg Phe Ala Ala Thr Cys Leu Ala
        195   200   205

Leu Gly Val Ala Leu Asp Ala Ala Leu Cys Pro Gln Pro Leu Ala Val
    210   215   220

```
Thr Arg Arg Leu Thr Glu Ala Val Glu Asp Val Arg Ala Leu Val Gly
225                 230             235                 240

Asp Leu Val Glu Ala Arg Arg Thr Gln Pro Gly Asp Asp Leu Leu Ser
            245             250                 255

Ala Val Leu His Ala Gly Ser Ser Ala Ala Ser Ala Gly Gln Asp Ala
            260             265                 270

Leu Ala Val Gly Val Leu Thr Ala Val Val Gly Val Glu Val Thr Ala ·
        275             280             285

Gly Leu Ile Asn Asn Thr Leu Glu Ser Leu Leu Thr Arg Pro Val Gln
    290             295             300

Trp Ala Arg Leu Gly Glu Asn Pro Glu Leu Ala Ala Gly Ala Val Glu
305             310             315                 320

Glu Ala Leu Arg Phe Ala Pro Pro Val Arg Leu Glu Ser Arg Ile Ala
            325             330             335

Ala Glu Asp Leu Thr Leu Gly Gly Gln Asp Leu Pro Ala Gly Ala Gln
        340             345             350

Val Val Val His Val Gly Ala Ala Asn Arg Asp Pro Glu Ala Phe Leu
    355             360             365

Ala Pro Asp His Phe Asp Leu Asp Arg Pro Ala Gly Gln Gly Gln Leu
    370             375             380

Ser Leu Ser Gly Pro His Thr Ala Leu Phe Gly Ala Phe Ala Arg Leu
385             390             395             400

Gln Ala Glu Thr Ala Val Arg Thr Leu Arg Glu Arg Arg Pro Val Leu
            405             410             415

Ala Pro Ala Gly Ala Val Leu Arg Arg Met Arg Ser Pro Val Leu Gly
        420             425             430

Ala Val Leu Arg Phe Pro Leu Thr Thr Ser Ala
        435             440
```

```
<210> 8
<211> 267
<212> PRT
<213> Streptomyces galilaeus

<400> 8
Val Asn Arg Ala Ala Arg Pro Thr Val Arg Gly Met Ser Ala Ile Ala
  1             5                 10                  15

Glu Pro Thr Ala Pro Arg Gly Val Ile Val Thr Gly Gly Gly Thr Gly
            20              25                  30

Ile Gly Arg Ala Thr Ala His Ala Phe Ala Asp Arg Gly Asp Arg Val
        35              40                  45
```

```
Leu Val Val Gly Arg Thr Ala Ala Thr Leu Ala Gly Thr Ala Glu Gly
    50                      55                  60

His Pro Gly Ile Ser Val Leu Thr Ala Asp Leu Thr Asp Pro Asp Gly
65                      70                  75                  80

Pro Arg Ala Ile Thr Asp Ala Ala Leu Asp Ala Leu Gly Arg Ile Asp
                    85                  90                  95

Val Leu Val Asn Asn Ala Ala Thr Gly Gly Phe Ala Gly Leu Ala Glu
                100                 105                 110

Thr Glu Pro Glu Ala Ala Arg Glu Gln Phe Asp Ser Asn Leu Leu Ala
            115                 120                 125

Pro Leu Leu Leu Thr Arg Gln Thr Leu Asp Ala Leu Ser Ala Asp Gly
    130                 135                 140

Gly Gly Thr Val Leu Asn Ile Gly Ser Ala Gly Ala Leu Gly Arg Arg
145                 150                 155                 160

Ala Trp Pro Gln Asn Gly Val Tyr Gly Ala Ala Lys Ala Gly Leu Asp
                165                 170                 175

Phe Leu Thr Arg Thr Trp Ala Val Glu Leu Ala Pro Arg Gly Ile Arg
            180                 185                 190

Val Leu Gly Leu Ala Pro Gly Val Ile Asp Thr Gly Ile Gly Glu Arg
        195                 200                 205

Ser Gly Met Ser Arg Glu Ala Tyr Ala Gly Phe Leu Gly Gln Ile Ala
    210                 215                 220

Ala Arg Val Pro Ala Gly Arg Val Gly Arg Pro Glu Asp Ile Ala Trp
225                 230                 235                 240

Trp Ala Val Gln Leu Ala Asp Pro Arg Ala Ala Tyr Ala Thr Gly Ala
                245                 250                 255

Val Leu Ala Val Asp Gly Gly Leu Ser Leu Thr
            260                 265
```

```
<210> 9
<211> 144
<212> PRT
<213> Streptomyces galilaeus

<400> 9
Met Thr Ala Gln Ala Pro Thr Ala Pro Ala Asp Val Tyr Ala Glu Val
    1                   5                   10                  15

Gln His Phe Tyr Ala Arg Gln Met Arg Tyr Leu Asp Ser Gly Glu Ala
                20                  25                  30

Glu Thr Trp Ala Gly Thr Phe Thr Glu Asp Gly Ser Phe Ala Pro Pro
            35                  40                  45
```

Ser Leu Pro Glu Pro Val Arg Gly Arg Pro Leu Leu Ala Glu Gly Ala
    50   55   60

Arg Asn Ala Ala Ala Gly Leu Ala Ala Ala Arg Glu Thr His Arg His
65   70   75   80

Trp Val Gly Met Leu Thr Val Thr Pro Ala Asp Asp Gly Ser Leu Thr
                85   90   95

Ala Glu Ser Leu Val Ser Ile Val Ala Val Ala Gln Gly Gly Pro Ala
            100   105   110

Arg Leu His Leu Val Cys Thr Cys Arg Asp Val Leu Val Arg Glu Gly
        115   120   125

Gly Arg Leu Leu Val Arg Glu Arg Val Val Thr Arg Asp Asp Arg Pro
    130   135   140

<210> 10
<211> 259
<212> PRT
<213> *Streptomyces galilaeus*

<400> 10
Val Arg Ile Ile Asp Leu Ser Ser Pro Val Asp Ala Ala Gly Phe Glu
1   5   10   15

Pro Asp Pro Val Val His Asp Val Leu Gly Pro Lys Glu Ala Ala Thr
            20   25   30

His Met Ser Glu Glu Met Arg Glu His Phe Gly Ile Asp Phe Asp Pro
            35   40   45

Ala Glu Leu Pro Glu Gly Glu Phe Leu Ser Leu Asp Arg Leu Gln Leu
    50   55   60

Thr Thr His Thr Gly Thr His Val Asp Ala Pro Ser His Tyr Gly Thr
65   70   75   80

Arg Ala Ala Tyr Arg Asp Gly Pro Pro Arg His Ile Asp Glu Met Pro
            85   90   95

Leu Asp Trp Phe Phe Arg Pro Ala Val Val Leu Asp Leu Ser Asp Gln
            100   105   110

Gly Thr Gly Ala Val Gly Ala Asp Val Leu Arg Arg Glu Met Asp Arg
        115   120   125

Ile Gly His Thr Pro Ser Pro Met Asp Ile Val Leu Leu Arg Thr Gly
    130   135   140

Ala Asp Ala Trp Ala Gly Thr Pro Lys Tyr Phe Thr Asp Phe Thr Gly
145   150   155   160

Leu Asp Gly Ser Ala Val His Leu Leu Leu Asp Leu Gly Val Arg Val
            165   170   175

Ile Gly Thr Asp Ala Phe Ser Leu Asp Ala Pro Phe Gly Asp Ile Ile
            180   185   190

Thr Arg Tyr Arg Ala Thr Gly Asp Pro Ser Val Leu Trp Pro Ala His
            195   200   205

Val Ile Gly Arg Asp Arg Glu Tyr Cys Gln Val Glu Arg Leu Ala Gly
    210   215   220

Leu Asp Arg Leu Pro Ala Ala His Gly Phe Arg Val Ala Cys Phe Pro
225   230   235   240

Val Arg Ile Ala Gly Ala Gly Ala Gly Trp Thr Arg Ala Val Ala Leu
            245   250   255

Val Asp Glu

<210> 11
<211> 238
<212> PRT
<213> *Streptomyces galilaeus*

<400> 11
Met Tyr Gly Arg Glu Leu Ala Asp Val Tyr Glu Ala Ile Tyr Arg Ser
  1   5   10   15

Arg Gly Lys Asp Trp Gly Gln Glu Ala Ala Asp Val Ser Arg Ile Ile
            20   25   30

Thr Glu Arg Arg Pro Gly Ala Gly Ser Leu Leu Asp Val Ala Cys Gly
            35   40   45

Thr Gly Ala His Leu Ser Val Phe Ser Thr Leu Phe Glu Val Ala Glu
    50   55   60

Gly Leu Glu Ile Ala Glu Pro Met Arg Arg Leu Ala Glu Gln Arg Leu
65   70   75   80

Pro Gly Thr Thr Val His Ala Gly Asp Met Arg Asp Phe Arg Leu Pro
            85   90   95

Arg Thr Tyr Asp Ala Val Ser Cys Met Phe Cys Ala Ile Gly Tyr Leu
            100   105   110

Glu Thr Leu Asp Asp Met Arg Ala Ala Val Arg Ser Met Ala Ala His
            115   120   125

Leu Glu Pro Gly Gly Val Leu Val Val Glu Pro Trp Trp Phe Pro Glu
            130   135   140

Asn Phe Ile Glu Gly Tyr Val Ala Gly Asp Leu Ala Arg Glu Glu His
145   150   155   160

Arg Thr Ile Ala Arg Ile Ser His Thr Thr Arg Lys Gly Arg Ala Thr
                165   170   175

Arg Met Glu Val Arg Phe Thr Val Gly Asp Ala Ala Gly Ile Gln Gln
        180   185   190

Phe Thr Glu Ile Asp Val Leu Thr Leu Phe Thr Arg Asp Glu Tyr Thr
        195   200   205

Ala Ala Phe Thr Asp Ala Gly Cys Ser Val Glu Phe Leu Glu Asp Gly
        210   215   220

Pro Thr Gly Arg Gly Leu Phe Val Gly Val Arg Glu Gln Arg
225   230   235

<210> 12
<211> 291
<212> PRT
<213> *Streptomyces galilaeus*

<400> 12
Met Lys Gly Ile Ile Leu Ala Gly Gly Ser Gly Thr Arg Leu His Pro
 1   5   10   15

Ile Thr Val Ser Val Ser Lys Gln Leu Leu Pro Val Gly Asp Lys Pro
                20   25   30

Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Ala Asp Ile Arg Glu
        35   40   45

Ile Leu Leu Ile Cys Thr Glu Arg Asp Leu Glu Gln Phe Arg Arg Leu
    50   55   60

Leu Gly Asp Gly Ser Gln Leu Gly Leu Arg Ile Asp Tyr Ala Val Gln
65   70   75   80

Asn Arg Pro Ala Gly Leu Ala Asp Ala Phe Val Ile Gly Ala Asp His
                85   90   95

Val Gly Asp Asp Asp Val Ala Leu Val Leu Gly Asp Asn Ile Phe His
            100   105   110

Gly His His Phe Tyr Asp Leu Leu Gln Ser Asn Val His Asp Val Gln
        115   120   125

Gly Cys Val Leu Phe Gly Tyr Pro Val Glu Asp Pro Glu Arg Tyr Gly
        130   135   140

Val Gly Glu Thr Asp Ala Ser Gly Gln Leu Val Ser Leu Glu Glu Lys
145   150   155   160

Pro Leu Arg Pro Arg Ser Asp Leu Ala Ile Thr Gly Leu Tyr Leu Tyr
                165   170   175

Asp Asn Glu Val Val Asp Ile Ala Lys Asn Leu Arg Pro Ser Pro Arg
                180   185   190

Gly Glu Leu Glu Ile Thr Asp Val Asn Arg Asn Tyr Leu Ala Arg Gly
        195   200   205

```
Arg Ala Arg Leu Val Asp Leu Gly Arg Gly Phe Ala Trp Leu Asp Ala
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```

```
Gly Thr Pro Glu Ser Leu Leu Gln Ala Thr Gln Tyr Val Arg Thr Leu
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```

```
Glu Glu Arg Gln Gly Val Arg Ile Ala Cys Val Glu Glu Val Ala Leu
            245             250             255
```

```
Arg Met Gly Phe Ile Asp Ala Asp Met Cys His Arg Leu Gly Glu Gln
            260             265             270
```

```
Met Ser Gln Ser Gly Tyr Gly Arg Tyr Val Met Ala Val Ala Arg Glu
        275             280             285
```

```
Phe Ser Gly
    290
```

```
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<212> PRT
<213> Streptomyces galilaeus
```

```
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```

```
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```

```
Val Leu Gly Asp Ser Val Arg Gly Phe Glu Glu Glu Phe Ala Ala Tyr
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```

```
His Gly Ala Ala His Cys Val Gly Val Asp Asn Gly Thr Asn Ala Ile
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```

```
Lys Leu Ala Leu Gln Ala Leu Gly Val Gly Pro Gly Asp Glu Val Val
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```

```
Thr Val Ser Asn Thr Ala Ala Pro Thr Val Val Ala Ile Asp Ser Val
            85              90              95
```

```
Gly Ala Thr Pro Val Phe Val Asp Val His Pro Asp Ser Tyr Leu Met
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```

```
Asp Thr Glu Gln Val Glu Ala Ala Leu Thr Pro Arg Thr Arg Cys Leu
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```

```
Leu Pro Val His Leu Tyr Gly Gln Cys Val Asp Leu Ala Pro Leu Glu
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```

```
Arg Leu Ala Ala Glu His Asp Leu Phe Leu Val Glu Asp Cys Ala Gln
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```

```
Ala His Gly Ala Arg Arg Ala Gly Arg Leu Ala Gly Thr Thr Gly Asp
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```

```
Ala Ala Ala Phe Ser Phe Tyr Pro Thr Lys Val Leu Gly Ala Tyr Gly
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Asp Gly Gly Ala Val Val Thr Ser Arg Asp Asp Thr His Arg Ala Leu
            195                 200                 205

Arg Arg Leu Arg Tyr Tyr Gly Met Glu Glu Arg Tyr Tyr Val Val Gly
    210                 215                 220

Thr Pro Gly His Asn Ala Arg Leu Asp Glu Val Gln Ala Glu Ile Leu
225                 230             . 235                 240

Arg Arg Lys Leu Arg Arg Leu Asp Thr Tyr Ile Glu Gly Arg Arg Ala
            245                 250                 255

Val Ala Arg Arg Tyr Glu Asp Gly Leu Gly Asp Thr Gly Leu Val Leu
            260                 265                 270

Pro His Thr Val Pro Gly Asn Glu His Val Tyr Tyr Val Tyr Thr Val
            275                 280                 285

Arg His Pro Arg Arg Asp Asp Ile Ile Lys Ala Leu Lys Ala Tyr Asp
    290                 295                 300

Ile Glu Leu Asn Ile Ser Tyr Pro Trp Pro Val His Thr Met Ser Gly
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Phe Ala His Leu Gly Tyr Gly Lys Gly Ser Leu Pro Val Thr Glu Asp
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Leu Ala Gly Gln Ile
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